

## **2.10 SURFACE WATER RUNOFF**

***WAC 463-42-215 Proposal – Surface-water runoff.** The applicant shall describe how surface-water runoff and erosion are to be controlled during construction and operation to assure compliance with state water quality standards.*

### **2.10.1 Introduction and Storm Water Pollution Prevention Plan (SWPPP)**

#### **2.10.1.1 Introduction**

In general, the Kittitas Valley Wind Power Project (the “Project”) wind turbines, site roads, underground cables, and other supporting infrastructure are located on higher ridge tops with good wind exposure and not in wetlands or watercourses. The site construction plans will include detailed provisions and specifications to help minimize erosion and storm water pollution.

#### **2.10.1.2 Storm Water Pollution Prevention Plan (SWPPP)**

A detailed construction Storm Water Pollution Prevention Plan (SWPPP) will be developed for the Project to help minimize the potential for discharge of pollutants from the site during construction activities. The SWPPP will be designed to meet the requirements of the Washington State Department of Ecology General Permit to Discharge Storm Water through its storm water pollution control program (Chapter 173-220 WAC) associated with construction activities.

The SWPPP will include both structural and non-structural best management practices (BMPs). Examples of structural BMPs could include the installation of silt curtains and/or other physical controls to divert flows from exposed soils, or otherwise limit runoff and pollutants from exposed areas of the site. Examples of non-structural BMPs include management practices such implementation of materials handling, disposal requirements and spill prevention methods.

A SWPPP meeting the conditions of the Storm Water General Permit for Construction Activities will be prepared and submitted to EFSEC along with a Notice of Intent (NOI) for construction activities prior to the start of Project construction activities.

#### **2.10.1.3 Storm Water Pollution Prevention Plan Design**

The SWPPP will be prepared along with detailed Project grading plan design by the Engineering, Procurement and Construction (EPC) Contractor when design level topographic surveying and mapping is prepared for the Project site. The final configuration of proposed improvements will be overlaid onto the detailed topographic maps and the Project civil design engineer will establish the locations and types of construction BMPs to be required of the EPC Contractor. These details will be included on an overall map of the Project site.

A narrative section of the SWPPP will describe the intended installation sequence and function of the selected BMPs, and present the sizing calculations. The plan also will identify the selected minimum standards to which each of the BMPs are to be constructed or installed. When prepared at this level of detail, the document will meet the requirements of the Storm Water Construction Activity NPDES permit system, and will accurately describe to the EPC Contractor, and the Project site construction management team, the improvements and actions required during construction. When complete and submitted to EFSEC, the SWPPP will then be included in the

construction bid and contract documents. Implementation of the construction BMPs will be carried out by the EPC contractor, with enforcement supervised by the Project's environmental monitor who will be responsible for implementing the SWPPP.

## **2.10.2 Site Construction: General Storm Water Pollution Prevention Measures**

Site-specific BMPs will be identified on the construction plans for the site slopes, construction activities, weather conditions, and vegetative buffers. The sequence and methods of construction activities will be controlled to limit erosion. Clearing, excavation, and grading will be limited to the minimum areas necessary for construction of the Project. Surface protection measures, such as erosion control blankets or straw matting, also may be required prior to final disturbance and restoration if potential for erosion is high.

All construction practices will emphasize erosion control over sediment control through such non-quantitative activities as:

- Straw mulching and vegetating disturbed surfaces;
- Retaining original vegetation wherever possible;
- Directing surface runoff away from denuded areas;
- Keeping runoff velocities low through minimization of slope steepness and length; and
- Providing and maintaining stabilized construction entrances.

A more detailed description of the materials, methods and approaches used as part of the BMPs for effective storm water pollution prevention and erosion control are as follows:

### **2.10.2.1 Rain Level Monitoring**

The environmental monitor shall be responsible for checking and recording precipitation levels at the Project site using a rain gauge. This benchmark will be used to determine the performance of the SWPPP measures that have been implemented during construction. After construction, the O&M group will also continue to monitor rainfall amounts and monitor the in-place erosion control systems while re-seeded areas become more established. Modifications and additional landscaping will be performed where needed by the O&M group after Project construction is completed.

### **2.10.2.2 Mulching**

Loose straw shall be spread and punched into the ground in all areas where vegetation has been cleared.

### **2.10.2.3 Temporary Straw Bale and Silt Fence Sediment Barriers**

Temporary straw bale barriers and sediment fences shall be inspected by the Contractor immediately after each rainfall and at least daily during prolonged rainfall. Any required repairs, relocations, or additions shall be made promptly. No more than one foot of sediment shall be allowed to accumulate behind straw bales or silt fence sediment barriers. Sediment will be removed and re-graded into slopes. New lines of barriers installed uphill of sediment-laden barriers will be considered based on the rate at which the one foot of sediment accumulates.

Silt fences and straw bale sediment barriers will be maintained throughout the construction period, and beyond, until disturbed surfaces have been stabilized with vegetation. Silt fence construction specifications including fabric type, support spacing, and total length will be determined by local construction conditions during final design of the facilities.

#### **2.10.2.4 Check Structures And Sediment Traps**

Check structures, such as rock dams, hay bale check dams, dikes and swales will be used, where appropriate, to reduce runoff velocity as well as to direct surface runoff around and away from cut-and-fill slopes. Swales and dikes will also be used to direct surface water toward sediment traps.

#### **2.10.2.5 Matting And Erosion Control Blankets**

Depending upon weather conditions during the construction period, straw or jute matting or other suitable erosion control blankets will be used on the pad slopes and the drainage channel slopes if direct rainfall on the slopes will result in erosion prior to stabilization.



*Figure 2.10.2-1 Erosion Control Blankets and Silt Fencing used for Exposed Slope Stabilization as part of a SWPPP*

#### **2.10.2.6 Control of Excavation De-Watering**

All excavation work requiring de-watering will be discharged to the surrounding surface areas through a hose which will be moved as the water is pumped out to distribute the ground water over a large surface area to avoid causing increased erosion or storm water pollution.

#### **2.10.2.7 Storm Water Pollutants (Waste, Debris, Chemicals)**

In addition to erosion and sedimentation control on the Project site, it also is important to reduce potential for chemical pollution of surface waters during construction. Source control is the most effective method of preventing chemical water pollution. All pollutants, including waste materials and demolition debris, that occur on-site during construction will be handled and disposed of in a manner that does not cause contamination of storm water.

The site environmental monitor will be responsible for planning, implementing, and maintaining Best Management Practices (BMPs) for:

- Neat and orderly storage of any construction chemicals and spent containers in lined, bermed areas;
- Prompt clean up of construction phase spills;
- Regular disposal of construction garbage and debris using on-site dumpsters.

### **2.10.3 Road Construction Storm Water Pollution Control Measures**

Work on the access roads will include grading and re-graveling existing roads and construction of new roads. The site will have gravel roadways which will be generally a low profile design allowing water to flow over them in most areas. Erosion control measures to be installed during the work on the access roads includes:

- The maintenance of vegetative buffer strips between the impacted areas and any nearby receiving waterways;
- Installation of sediment fence/straw bale barriers on disturbed slopes and other locations shown on the SWPPP;
- Straw mulching at locations adjacent to the road that have been impacted;
- Providing temporary sediment traps and sediment type mats downstream of seasonal stream crossings;
- Installation of silt fencing on steeper exposed slopes;
- Planting of designated seed mixes at impacted areas.

At each turbine location, a crane pad area of approximately 3,000 square feet will be graded in place and covered with road rock. During construction, silt fences, hay bails, or matting will be placed on the down slope side of the crane pad areas. Wind turbine equipment such as the blades, tower sections and nacelles will be transported and off-loaded at each turbine location near the foundation and crane pad. After construction, disturbed areas around all crane pad staging areas will re-seeded as necessary to restore the area to its original condition.

The environmental monitor will be responsible for locating any necessary clean fill disposal sites for excess excavation spoils. To control the release of sediment from the disposal sites, silt fence with a straw bale barrier shall be installed on the down slope side of all disposal areas. If additional sediment or erosion control measures are determined to be necessary to control the release of sediment from the disposal sites, the environmental monitor shall be responsible for implementing these measures.

All areas that are impacted by the construction will be seeded when there is adequate soil moisture. They will be re-seeded if healthy cover vegetations do not grow. The sediment fence and check dams will remain in place until the impacted areas are well vegetated and the risk of erosion has been eliminated. The Project operations group will remove the sediment fence at this time.

### **2.10.4 Foundation Construction Storm Water Pollution Control Measures**

Foundation construction will require significant excavation at each wind turbine location. Excavation materials will be stored adjacent to the foundation holes as the forms, rebar and bolts are assembled and as the concrete cures after it is cast in place. Sediment fences, hay bails or matting will be installed on steeper down slopes near the storage piles. Once the concrete cures, excavated materials will be used for back filling. In impacted areas adjacent to pads, mulch will be spread and the area will be re-seeded. Cobbles and rocks too large for backfilling will be disposed of off-site, used in rock check-dams or to support other on-site erosion control measures.

### **2.10.5 Underground Cable Trenching Storm Water Pollution Control Measures**

Underground electrical and communications cables will be placed in 3- to 5-foot-wide trenches along the length of each wind turbine string corridor. In some cases trenches will run from the end of one turbine string to the end of an adjacent turbine string to link turbines via the underground network. Trenches will

be excavated from 1.5 to 4 feet deep varying depending on the underlying soil/rock conditions. Excavated materials will be piled alongside the cable trenches for back filling after cable installation. Sediment fences, hay bails or matting will be installed on steeper down slopes near the storage piles. After backfilling, excess excavated soils will be spread around the surrounding area and contoured to the natural grade. Cobbles and rocks too large for backfilling will be disposed of off-site, used in rock check-dams or to support other on-site erosion control measures. Finally, the area will be re-seeded with a designated seed mix, as appropriate to the location.

#### **2.10.6 Overhead Collector Line Construction Storm Water Pollution Control Measures**

Construction of the overhead pole line alongside Bettas Road will also require excavation for setting of the poles. Excavated materials will be piled alongside the excavations for back filling after pole installation. Sediment fences, hay bails or matting will be installed on any steep down slopes near the storage piles. After backfilling, excess excavated soils will be spread around the surrounding area and contoured to the natural grade. Cobbles and rocks too large for backfilling will be disposed of off-site, used in rock check-dams or to support other on-site erosion control measures. Finally, the area will be re-seeded with a designated seed mix, as appropriate to the location.

#### **2.10.7 Substation Construction Storm Water Pollution Prevention Measures**

The substation is generally flat and the base area will be graded and covered with a sub-base rock and a graveled surface on top. Foundation and underground trenching excavation spoils will be handled in the same manners as described in the above sections regarding foundations and underground cable trenches. Disturbed areas surrounding the substation perimeter shall be contoured to the natural grade covered in straw mulch, protected for erosion control and re-seeded as appropriate to the adjacent slopes. The main substation transformers, which are filled with mineral oil, are equipped with an oil level meter and float switch. The transformers will be surrounded by oil containment catch trenches around the outer perimeter of their foundations.

#### **2.10.8 Final Road Grading and Site Cleanup**

The Project will have dumpsters from a local sanitation company to collect recyclable materials and dispose of waste materials that could not be reused. A final site cleanup will be made before turning the Project over to the O&M group. In accordance with the Erosion & Sediment Control Plan for access road improvement and construction, county roads will be restored to at least their pre-Project condition and to the satisfaction of the Kittitas County public works department.

#### **2.10.9 Storm Water Management During Project Operations**

As described above, the Project will prepare and define a Storm water Pollution Prevention Plan as part of the final design. The Project operations group will be responsible for monitoring the SWPPP measures that were implemented during construction to ensure they continue to function properly. Final designs for the permanent BMPs will be incorporated into the final construction plans and specifications prepared by the engineering team's civil design engineer. An operations manual for the permanent BMPs will be prepared by the EPC contractor civil design engineer and the Project's engineering team.

The permanent storm water BMPs will include permanent erosion and sedimentation control through site landscaping, grass, and other vegetative cover. The final designs for these permanent BMPs will conform to the Washington Department of Ecology Storm water Management Manual.

Operational BMPs will be adopted, as part of the SWPPP, to implement good housekeeping, preventive and corrective maintenance procedures, steps for spill prevention and emergency cleanup, employee training programs, and inspection and record keeping practices, as necessary, to prevent storm water pollution.

Examples of good operational housekeeping practices, which will be employed by the Project, include:

- Prompt cleanup and removal of any spillage;
- Restricting vehicle travel to access roads;
- Regular pickup and disposal of garbage and rubbish;
- Regular sweeping of floors;
- Proper storage of containers.

The Project operations group will periodically review the SWPPP against actual practice. The Operations Manager will ascertain that the controls identified in the plan are adequate, and that employees are following them. A summary of these in-house compliance inspections will be kept with the SWPPP, along with any notifications and reports of non-compliance items or areas. If the SWPPP has been followed but still proves to be inadequate to prevent storm water pollution, the SWPPP will be adjusted and/or amended and resubmitted to the Washington Department of Ecology for concurrence.